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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/577,233

04/26/2006

Jan Tuma

51101

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1609 7590 09/28/2010

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EXAMINER

ABRAHAM, AMJAD A

ART UNIT

PAPER NUMBER

1791

MAIL DATE

DELIVERY MODE

09/28/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,233	<b>Applicant(s)</b> TUMA, JAN	
	<b>Examiner</b> AMJAD ABRAHAM	<b>Art Unit</b> 1791	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 10, 14, 16, 18, 20-22, 26, 28, 30, 32-34, 38, 40, 42 and 44-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10, 14, 16, 18, 20-22, 26, 28, 30, 32-34, 38, 40, 42 and 44-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

Applicant's remarks and amendments, filed on July 20, 2010, have been carefully considered. Claims 10, 18, 22, 30, 34, and 42 have been amended. Claims 13, 17, 25, 29, 37, and 41, have been canceled. Claims 46-51 have been added as new claims. This leaves claims 10, 14, 16, 18, 20-22, 26, 28, 30, 32-34, 38, 40, 42, 44-51 still pending.

#### **New Grounds of Rejection due to applicant's amendments dated July 20, 2010.**

#### ***Claim Rejections - 35 USC § 112 1<sup>st</sup> Paragraph***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 47, 49, and 51 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- a. Applicant's specification does not have support for wherein the beginning is at least 1/3 length portion of a curvature length.

***Claim Rejections - 35 USC § 112 2<sup>nd</sup> Paragraph***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 10, 14, 16, 18, 20-22, 26, 28, 30, 32-34, 38, 40, 42, 44-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. Claims 10, 22, and 34 disclose the claim limitation “each of the mold cavities having a circumferential boundary wall extending in a lengthwise direction thereof continuously along a convex path, each convex path having a curvature with increased radii of curvature adjacent an inner end and decreased radii of curvature adjacent an outer end.” This limitation is describing the mold cavity shown in applicant’s figure 2. However, claim 10 (a flared end forming head with essentially flat end surfaces), claim 22 (a flared end forming head with a slightly convex end surface), and claim 34 (a flared end forming head with end surfaces having a concavity).

- i. It is unclear how the same mold cavity can form three different configurations.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 10, 16, 18, 22, 28, 30, 34, 40, 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arzt et al. (WIPO Publication WO 03/099951 A2) in view of Tuma (Wipo Publication WO 2002/013647 A2).

4. **Examiner is using Arzt et al. (US Pre-Grant Publication 2006/0005362) as the English Language Equivalent of WO 03/099951) and Tuma (USP No. 7,198,743) as the English Language equivalent of Tuma (Wipo WO 2002/013647)..**

5. Regarding claims 10, 22, and 34, Arzt teaches a process for producing adhesion elements on a substrate (object – part 10 of figure 1). **(See abstract and figure 1).**

a. Arzt goes on to teach:

i. The use of polyvinyl siloxane as the material/object to be molded or shaped in order to form adhesion elements.

(1) **See paragraph 0103 for Polyvinyl siloxane**

(2) **See paragraphs 0086-0087 and 0094-0095 disclosing shaping/molding o the polyvinyl siloxane**

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ii. Wherein the packing density is  $10^6$  to  $10^7$  per  $\text{cm}^2$ .

(3) **See paragraph 0069**

iii. The adhesion elements (projections) having a height from 20000 nm to 200 micrometers a diameter of 20 nanometers to 20 micrometers.

(4) **See paragraph 0068 to 0070**

(5) **See figure 6 show height (part a) and diameter (b)**

iv. The end is at least 20 micrometers.

(6) **See figure 6 show height (part a) and diameter (b)**

(7) **See also figures showing that flared ends can be a greater size than the ends of the projections**

v. Wherein the ends can be flared.

(8) **See Figures 7-9**

vi. Flared ends can be shaped

(9) **For claim 10 – see figure 7 (a) showing flared end (16) which is flat**

(10) **For claim 22 – see figure 7 (c) showing flared end (16) which is convex**

(11) **For claim 34 – see figure 7 (d or e) showing flared end (16) which is concave**

vii. Wherein the contact angle of the adhesion elements is greater than 70 degrees.

(12) **See paragraph 0016, 0066, and figures 4, 6, and 7-9.**

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- b. With respect to claims 10, 22, and 34, Arzt does not expressly teach wherein each of the mold cavities have a circumferential boundary wall extending in a lengthwise direction thereof continuously along a convex path, each convex path having a curvature with increased radii of curvature adjacent an inner end and decreased radii of curvature adjacent an outer end.
- c. However, Tuma teaches when forming a fastening or adhesive structure a mold cavity is used which matches the dimensions of the element to be shaped as the mold cavity. **(See figures 2 and 3 and column 4 line 30 to column 5 line 11)**. The shaping element in Tuma has circumferential boundary walls parallel from one another which are convex in nature. **(See part 13 of figure 2)**. These walls are curved to match the desired construction of the fastening/adhesive element.
- viii. It would have been obvious to one having the ordinary skill in the art to use the mold technique of Tuma to create the adhesion elements of Arzt for the benefit of creating a large quantity of adhesion elements. As the use of shaping elements like the one of Tuma are well known in the adhesion element art, it would have been obvious for one having the ordinary skill in the art to use the mold of Tuma to make the structures of Arzt to form intricate parts in a uniform manner.
6. Regarding claims 16, 28, and 40, Arzt teaches the formation of various types of adhesion element shapes such as a concave/convex shape that must have been formed from a mold cavity having a similar shape to a hyperboloid. **(See figure 7)**.

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d. Tuma also teaches using the same mold cavities to form hyperboloids.

**(See column 3 line 36 and column 4 line 40)**

7. Regarding claims 18, 30, and 42, Arzt teaches wherein the contact angle of the adhesion elements is greater than 70 degrees.

e. **(See paragraph 0016, 0066, and figures 4, 6, and 7-9).**

8. Regarding claims 46-51, the Arzt does not teach wherein: (1) the curvature with the increased radii of curvature has a beginning closer to the inner end than the outer end and (2) wherein the beginning is at least 1/3 length portion of a curvature length.

f. However, Tuma teaches when forming a fastening or adhesive structure a mold cavity is used which matches the dimensions of the element to be shaped as the mold cavity. **(See figures 2 and 3 and column 4 line 30 to column 5 line 11).** The shaping element in Tuma has circumferential boundary walls parallel from one another which are convex in nature. **(See part 13 of figure 2).** These walls are curved to match the desired construction of the fastening/adhesive element.

ix. The curvature and design of the mold cavity would be dependant on the element to be produced. It would have been obvious to one having the ordinary skill in the art to have a mold cavity which is the exact shape of the structure to be produced in order to form uniform parts.



9. Claims 20, 32, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arzt et al. (WIPO Publication WO 03/099951 A2) in view of Tuma (Wipo Publication WO 2002/013647 A2) in view of Fearing et al. (US Pre-Grant Publication 2003/0208888).

10. Regarding claims 20, 32, and 44, Arzt teaches wherein the height is up to 200 micro meters. **(See paragraphs 0068-0070).**

g. The combination of Arzt and Tuma does not explicitly teach: (1) wherein the adhesion elements have a diameter of 30 micrometers and a flared end of approximately 50 micrometers.

x. Moreover, Fearing does teach wherein making adhesive microstructures, one having the ordinary skill in the art would seek to optimize: (1) the size of the microstructures; (2) the stiffness of the microstructures; (3) the adhesive force ( $F_o$ ); and (4) the packing density of the microstructures. **(See paragraphs 0072-0077).** Adjusting the size of the microstructures is done to adjust the adhesion strength and the packing density and would be optimized by one having the ordinary skill in the art.

xi. It would have been obvious to one having ordinary skill in the art at the time of invention to adjust the size of the adhesion element in order to optimize the adhesion strength of the microstructures, since it has been held that discovering an optimum value of a result effective variable

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involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

11. Claims 14, 26, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arzt et al. (WIPO Publication WO 03/099951 A2) in view of Tuma (Wipo Publication WO 2002/013647 A2) in further view of Full et al. (US Pre-Grant Publication 2005/0072509).

12. Regarding claims 14, 26, and 38, the combination of Arzt and Tuma does not expressly teach wherein the shaping element is a drum-shaped screen having at least 16,000 mold cavities per cm<sup>2</sup>.

h. However, Arzt and Tuma both disclose that imprinting can be used to form the shaped elements as a high rate of cavities per cm<sup>2</sup>.

xii. **See Arzt at paragraph 0087**

xiii. **See Tuma at column 4 lines 12-29.**

xiv. Full further teaches the use of an imprinting roller in order to achieve the desired mold cavities per cm<sup>2</sup>. **(See Figure 11A).**

Nanoimprinting is a well known process for achieving a high number of cavities onto a surface. As Fearing has envisaged such a nano-imprinting process a roller with mold cavities like the one disclosed in Full would be a conventional choice for one having the ordinary skill in the art.

xv. This imprinting roller is the drum shaped screen having the requisite mold cavities per cm<sup>2</sup>.

13. Claims 21, 33, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arzt et al. (WIPO Publication WO 03/099951 A2) in view of Tuma (Wipo Publication WO 2002/013647 A2) in further view of George et al. (USP No. 7,018,496).

14. Regarding claims 21, 33, and 45, the combination of Arzt and Tuma does not teach wherein the plastic material is crosslinked with or after molding of the adhesion elements.

i. However, George teaches wherein thermosetting compositions can be mixed with thermoplastic compositions and crosslinked in order to achieve an adhesion element having a high ultimate strength and heat resistance. **(See column 13 lines 8-17).**

j. Thus it would have been obvious to cross link the plastic composition in order to make the adhesion elements stiffer.

### ***Response to Arguments***

15. Applicant's arguments with respect to claims 10, 14, 16, 18, 20-22, 26, 28, 30, 32-34, 38, 40, 42, 44-51 have been considered but are moot in view of the new ground(s) of rejection.

16. **Applicant argument #1:**

k. Applicant argues that Arzt does not teach a thixotropic polyvinyl siloxane.

17. **Examiner response #1:**

l. It is examiner's position that polyvinyl siloxane is inherently thixotropic. For support examiner provides: (1) Jenkins et al. (US Pre-Grant Publication 2006/0047190) disclosing that polyvinyl siloxane is a thixotropic material. **(See paragraph 0080)** and (2) Hahn et al. (USP No. 7,318,464) which teaches that siloxanes/polysiloxanes are known for their thixotropic properties. **(See column 7 line 64 to column 8 line 2).**

m. In the alternative, if applicant submits that polyvinyl siloxane is not inherently thixotropic, there may be a new matter issue as applicant in page 9 of their specification has only disclosed the use of thixotropic materials separate from that of polyvinyl siloxane.

***Conclusion***

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMJAD ABRAHAM whose telephone number is (571)270-7058. The examiner can normally be reached on Monday through Friday 8:00 AM to 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Phillip Tucker can be reached on (571) 272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AAA

/Philip C Tucker/

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Supervisory Patent Examiner, Art Unit 1791